



Annual Report 1965

Eldorado Mining and Refining Limited

and subsidiary Eldorado Aviation Limited

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President's Letter

The Honourable Jean-Luc Pepin,
Minister of Mines and Technical Surveys,
Ottawa, Ontario.

Sir:

On behalf of the Board of Directors, and in accordance with Section 85(3) of The Financial Administration Act, I have the honour to submit the Annual Report of Eldorado Mining and Refining Limited and its subsidiary Company, Eldorado Aviation Limited, for the year ended December 31, 1965.

As had been forecast, sales of Canadian uranium dropped again in 1965. Total industry sales of uranium oxides for export through Eldorado amounted to 7,059,466 pounds, 37 per cent less than the 11,259,229 pounds sold in 1964; and the value in 1965 at \$55,128,622 was 28 per cent less than the figure of \$76,298,692 for the preceding year. The poundage sold in 1965 was equal to only 23 per cent of that for the peak year 1959, and its value only 17 per cent of the 1959 figure.

It is expected that the production of uranium in Canada through 1966 will be maintained at the level in effect at the close of 1965. This is attributable to the stockpiling policy of the Government of Canada which became effective as of July 1, 1965.

The action of the Government was based upon a comprehensive study of estimated Western world

requirements for uranium through the late 1960's and all of the 1970's. Authorities believe there will be a rapid rise in demand in this period and that by the mid-1970's the industry will be hard-pressed to meet it from the known reserves. Under these circumstances, it was decided that it would not be in Canada's interest to allow the production of the domestic uranium industry to shrink below the level as of July 1, 1965. The same reason led to a decision to assure continuing operation of Eldorado's refinery, by means of an arrangement under which material purchased for the stockpile in the period 1965-1968 is to be refined to UO_3 , the initial step in preparing uranium for enrichment processing.

The rising demand for uranium stems, of course, from the rapid development of the nuclear power industry. In 1965 alone contracts were written for 8,300 megawatts of new nuclear power capacity in Western nations, entailing a capital investment of 1.75 billions of dollars. There is every indication that this is little more than a beginning. It is interesting to note that almost half of the new capacity will be installed in the United States, where a million families already are receiving their needs in electrical energy from nuclear power stations.

For a number of years the reality of commercial nuclear power seemed to move further into the future, but there has been a marked change. The rapidly increasing body of operating experience,

and the results of many independent studies, demonstrate that in a number of industrialized areas of



W. M. GILCHRIST

the developed countries energy from nuclear reactors is not only competitive with that from other sources, but that further reduction in the cost per unit of output is likely in the years immediately ahead. This knowledge has prompted senior officials of many power utilities to insist that the planning for any large electrical generating facility shall

give full consideration to the adaptability and economics of the nuclear reactor.

It is necessary at this juncture to inject a note of warning as to the availability and cost of the uranium that will be needed as Western nations turn more and more to nuclear reactors for their energy needs.

The power utilities should be acutely aware that supplies of uranium, certainly in the volume indicated in the not-too-distant future, will not be obtained readily, simply, nor at present day prices.

Contrary to the kind of thinking prevalent only a few years ago, the Western world does not have unlimited quantities of uranium in the known ore bodies. Unless swift and effective action is taken to avert it, there will be a severe shortage of uranium much sooner than most people might expect.

Statistics on Western world reserves give a misleading impression and probably contribute to unwarranted complacency even in respect to relatively short-term requirements for uranium. On paper, the reserve tonnages are indeed adequate to take care of the needs of Western nations as forecast through to the late 1970's, but there is a vast difference between statistical tons and actual tons of uranium mined, processed, and ready for the nuclear reactor. Granted that the mines of the Western nations contain the reserves included in the statistics, it certainly does not follow automatically that production from these reserves can be maintained at levels in keeping with the growing rate of demand, particularly if the most economical rate of production is to be adhered to. Knowledgeable people in the mining industry fully realize that the requirement for uranium through

the 1970's cannot be met unless new ore bodies are found, new mines are brought into production, and the facilities of existing mines are expanded and made more efficient. This will take time and money.

The view beyond the 1970's reveals an even more critical situation. Current, widely-accepted forecasts of actual Western world consumption of uranium for nuclear power generation alone, are 12,000 tons in 1970, 33,000 tons in 1975, and 60,000 or more tons in 1980.

This enormous escalation of demand is far beyond the reserves and the productive potential of the uranium industry of the Western world as they exist today. It would be physically impossible for the industry to produce the quantities needed, from the known reserves.

Obviously, more ore deposits must be found; more and more mines must be brought into production, and there is every reason to believe that the mining industry can successfully meet this challenge, provided ample time and adequate sources of capital are available.

It must be emphasized that prospecting and the development of ore bodies are not exact sciences. The results of exploration and development usually are roughly proportionate to the amount of money expended, but there is always a time factor. In the boom years of the 1950's in Canada, even with price and other inducements to spur the effort, it usually took seven or eight years to find an ore deposit, carry out pre-production work, set up mine and mill facilities, and start producing uranium.

These are facts the power utilities should know about and act upon if they hope to assure themselves an adequate supply of uranium for their future needs. Time is of the essence, and so is money. The uranium mining industries of the Western world cannot be expected to generate from within, the large amounts of investment capital for the expansion of existing facilities, the discovery of new ore bodies, and the creation of new productive capacity. Most of the money will have to come from outside sources. This means that the profit margin in the price paid for uranium will have to be quite attractive, because if forecasts of general commercial and industrial activity are reasonably correct, the uranium industry will be seeking capital in a highly competitive market.

In light of the situation as outlined, there is no question that the prices at which small amounts of

uranium have been sold in recent years, and the support prices under various stockpiling programs, are not the prices on which the uranium industry can thrive and expand.

At the present time the United States, Canada, South Africa and France are the only Western nations producing significant amounts of uranium. Only three of the four mines producing in Canada are capable of yielding relatively substantial tonnages. Of a score or more other Canadian mines that were in operation during the peak years of the 1950's, the majority either exhausted their ore bodies or could not be operated economically at prices in the \$10.00 range. If all of the Canadian mines still producing uranium were to operate at full capacity, their combined output would be less than half that which was attained in the peak year 1959, when sales amounted to 15,900 tons. Total Canadian production of 85,500 tons over the period 1955-1965 inclusive placed Canada second only to the United States as a uranium producer.

These facts bring into sharp perspective the dimensions of demand as forecast in future years — 33,000 tons in 1975, 60,000 tons or more in 1980. They give emphasis to the need for exploration, for development, for planning, if Canada is to share to the full in the opportunities that lie ahead. With one-third of the total Western world reserves as known today, and a large potential area still to be intensively prospected, Canada undoubtedly will continue to have a large role as a uranium supplier in the nuclear age.

Comments on Eldorado Operations

As forecast in last year's Annual Report, the financial results of Eldorado Mining and Refining Limited showed a further decline in 1965. Nevertheless, it was a year of considerable activity in all divisions of the Company.

At the Refinery, research continued into the application of plant processes to the production of metals other than uranium, and to improvement of the processes themselves. Investigation into the production of cobalt, mentioned in last year's Report, was discontinued for the time being. Although the process was proved feasible, estimates of the capital cost of establishing a plant on a commercial scale made the production of cobalt less attractive than the production of other metals more closely associated with the field of nuclear energy.

A number of projects aimed at improvement of extractive processes and the lowering of costs at the mine were undertaken by the Research and Development Division, in addition to the work carried on at the Refinery.

The Sales Division was active and a number of small contracts for the supply of various uranium compounds and alloys were obtained. The dollar value of these contracts was not great, but the business generated indicated that the efforts of the Sales Division over a number of years have laid a firm foundation for a profitable activity in the not too distant future.

The Company's net income in 1965 of \$1,426,247 was substantially less than in 1964, reflecting the lower price received for its product under contractual commitments, as well as reduced income from financing of the 12,000-ton contract with the United Kingdom.

From the time it became a Crown corporation in 1944 to the end of 1965, Eldorado had paid to the Government in dividends and on the redemption of shares a total of \$33,740,000. In addition Eldorado has paid or provided for Federal income taxes of \$28,664,000, and \$4,042,000 in royalties to the Government of Saskatchewan. It also has provided in grants in lieu of property taxes to the various municipalities in which it operates, a total of \$3,120,000. After these charges, the balance sheet of the Company still shows a net worth of some \$52,600,000.

The subsidiary Company, Eldorado Aviation Limited, turned in, as usual, a commendable performance in 1965, and met the requirements of the parent Company and of the other subsidiary, Northern Transportation Company Limited. The results and operations of this latter subsidiary are covered in a separate report to The Minister of Northern Affairs and National Resources.

Your Board of Directors again records with pleasure its gratitude for the loyalty and effort of employees of Eldorado Mining and Refining Limited and its subsidiary companies, who have contributed so much to the success of the organization.

For the Directors,

W. M. Gilsburt

President

Ottawa, Canada
February 24, 1966.

Eldorado Mining and Refining Limited

Head Office: 150 Kent Street, Ottawa, Canada

Postal Address: P.O. Box 379, Ottawa, Canada

General Administration Office: Port Hope, Ontario, Canada

DIRECTORS

W. J. Bennett W. M. Gilchrist* F. R. Hadley W. F. James*
Gordon Lawson* J. E. Sydie W. G. Thompson

*Members of Executive Committee

OFFICERS

President: W. M. Gilchrist

Vice-President, Mining and Exploration: H. E. Lake

Vice-President, Refining: J. C. Burger

Secretary: R. C. Powell Treasurer: J. C. Orr

Director of Administration: C. Baschenis

MANAGERS

Beaverlodge Operation: A. R. Allen Refinery: R. M. Berry

Research and Development: A. Thunaes

DISTRICT OFFICES

Refining and Sales: Port Hope, Ontario Beaverlodge Mine: Eldorado, Saskatchewan

Metallurgical Laboratories: Tunney's Pasture, Ottawa, Canada

Vice-President, Mining and Exploration: 10040 - 105th Street, Edmonton, Alberta

Western Purchasing and Employment Office: 10040 - 105th Street, Edmonton, Alberta

ELDORADO AVIATION LIMITED

HEAD OFFICE: 150 Kent Street, Ottawa, Canada

OPERATIONS OFFICE: No. 11 Hangar, Municipal Airport, Edmonton, Alberta

DIRECTORS

W. J. Bennett A. B. Caywood W. M. Gilchrist
H. E. Lake P. L. P. Macdonnell

OFFICERS

President: A. B. Caywood

Secretary: R. C. Powell Treasurer: J. C. Orr

Eldorado Mining and Refining Limited Sales Agencies Abroad

Europe excluding Great Britain: N.V. Internationale Ertshandel "Wambersie", P.O. Box 1439, Calandstraat 7a, Rotterdam, Netherlands

Japan: Marubeni-Iida Co. Ltd., P.O. Box Central 595, Tokyo

Eldorado Mining and Refining Limited

and its wholly-owned subsidiary Eldorado Aviation Limited

General Report

This General Report includes comments upon the operations of Eldorado Mining and Refining Limited and of its wholly-owned subsidiary, Eldorado Aviation Limited, for the year ended December 31, 1965.

Income

The Company's net income for 1965 amounted to \$1,426,247. Net income in 1964 was \$2,450,490 after provision of \$2,400,000 for income tax. As a result of substantial tax allowances for capital cost, depletion and scientific research, no provision for tax was required on the lower income earned in 1965. Sales revenue at \$16,387,879 was slightly higher than that for 1964, but a very significant decrease in selling prices resulted in lower profits. Also, income from the Company's financing of ore procurement under the 12,000-ton contract with the United Kingdom decreased to \$906,630 during the year, compared with \$2,974,085 in 1964 when quantities delivered were much greater. There will be a further substantial reduction in income from this source in 1966.

Taxes

Although wholly owned by the Crown, Eldorado Mining and Refining Limited is subject to the usual taxes imposed upon private corporations, such as income, sales, and mining taxes. For 1965 allow-

ances for capital cost, depletion, and scientific research resulted in a loss for income tax purposes, and the portion of 1964 income tax thus recoverable, \$354,173, has been credited to surplus account.

Grants in lieu, equal to taxes at current rates, are paid to municipalities in which the Company's properties are situated. A total of \$360,239 was paid during 1965 in such grants to the municipalities of Uranium City, Port Hope, Ottawa, and Edmonton.

Dividends

A dividend of \$1,500,000 was paid by the Company to the Receiver General on December 17, 1965. The same amount was paid in 1964. The aggregate amount remitted to the Government in dividends and the redemption of shares has been \$33,740,000 since the ownership of Eldorado Mining and Refining Limited was acquired by the Crown in 1944.

Capital Expenditures

A total of \$675,500 was required for new plant and equipment installations during 1965, of which \$207,800 was for underground, mill and surface facilities at the mine, and \$108,400 for laboratory and pilot plant equipment purchased by the Research Division. Erection of a second stockpile warehouse at Port Hope, and necessary plant process and development equipment at the Refinery, involved an expenditure of \$352,000.

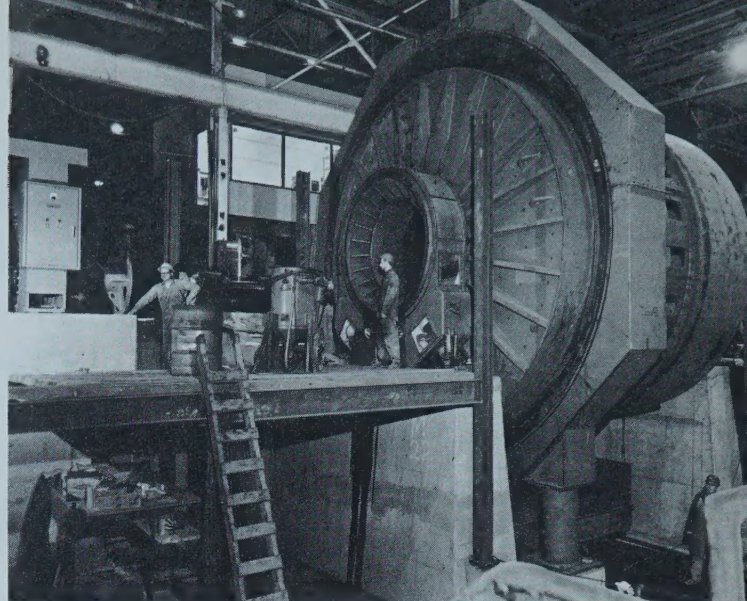
Mine Operations

Production in 1965 from the Beaverlodge Mine was 1,800,467 pounds of U_3O_8 recovered from 536,132 tons of ore, as against 1,837,029 pounds from 522,148 tons in 1964. The operating cost per pound increased by 5.6 per cent, because of increased development expense, a lower grade of ore, and an increase in wage and salary rates.

Comparative production statistics, excluding custom ore treated, are:

	<i>Tons of Ore Treated</i>	<i>Pounds U_3O_8 Recovered</i>	<i>Average Recovery Pounds per Ton</i>
1965	536,132	1,800,467	3.36
1964	522,148	1,837,029	3.52
1963	544,177	1,855,212	3.41
1962	563,580	1,959,788	3.48
1961	542,157	2,214,894	4.09
1960	625,127	2,454,400	3.93
1959	657,521	2,392,770	3.64
1958	676,354	2,507,663	3.71
1953-65 incl.	5,873,505	22,093,488	3.76

Development activity was much greater than in 1964, by 915 feet of shaft-sinking, 2,849 feet of lateral development, and 409 feet of raising.



Designed to reduce grinding costs at Beaverlodge, the new auto-genous mill installed over the past eighteen months went through a difficult breaking-in period during 1965.

A comparison of yearly development statistics, together with cumulative totals from the beginning of operations up to the end of 1965, follows:

	<i>(in feet)</i>	<i>1963</i>	<i>1964</i>	<i>1965</i>	<i>Cumulative Totals</i>
Shaft-sinking	—	—	—	915	8,041
Drifting and cross-cutting	18,456	17,708	20,557	247,997	
Raising	7,221	5,071	5,480	82,649	
Diamond drilling (underground)	75,708	108,423	97,002	1,068,487	
Sludge drilling	4,697	1,919	2,491	115,883	

Despite completion of the planned development program, the anticipated increase in ore reserves did not materialize because of a steepening in the rake of the orebodies. Consequently, the proved, probable and pillar ore reserves were only maintained at the 1964 year-end total of 1,500,000 tons grading 0.21 per cent U_3O_8 .

The lengthy process of breaking in the new auto-genous grinding mill seriously disrupted milling operations, and it was not until December that mechanical difficulties were largely overcome. The new oxygen plant gave relatively trouble-free performance from May through December, but capacity problems with the calciner were not resolved at year-end, owing to slow delivery of auxiliary equipment.

All capital projects were completed by the end of the year. The capital program for 1966 includes replacement of multiple-unit steam generating facilities with one large boiler; a mine air-heating plant; a new compressor for handling flue gas; aluminum mine cars for main haulages; and additional mine installations for development purposes.

A timbered drift on a sill floor deep in the Beaverlodge mine. The burlap covering permits drainage and retains sand backfill.

Refinery Operations

As the solvent extraction circuits were required for only 24 weeks on the production of UO_2 for the United States Atomic Energy Commission, advantage was taken of the remaining time for use of the circuits for further development work on cobalt. Technical results were most encouraging, but it was decided to postpone commercial production of cobalt, at least for the time being.

A new storage building was erected for concentrates received since July under the second Canadian Government stockpiling program. The decision to refine these concentrates will result in continuance of solvent extraction operations for three years. The UO_2 end product will require considerably less storage space and will be a more acceptable product for future conversion and marketing.

There was an increase in market demand for ceramic grade UO_2 and this product of Eldorado's refinery is gaining wide acceptance because of its excellent sintering characteristics. Enriched UO_2 conversion and processing also increased over the previous year, with foreign orders contributing significantly to the volume. Production of enriched uranium-aluminum alloy billets continued at a satisfactory level.

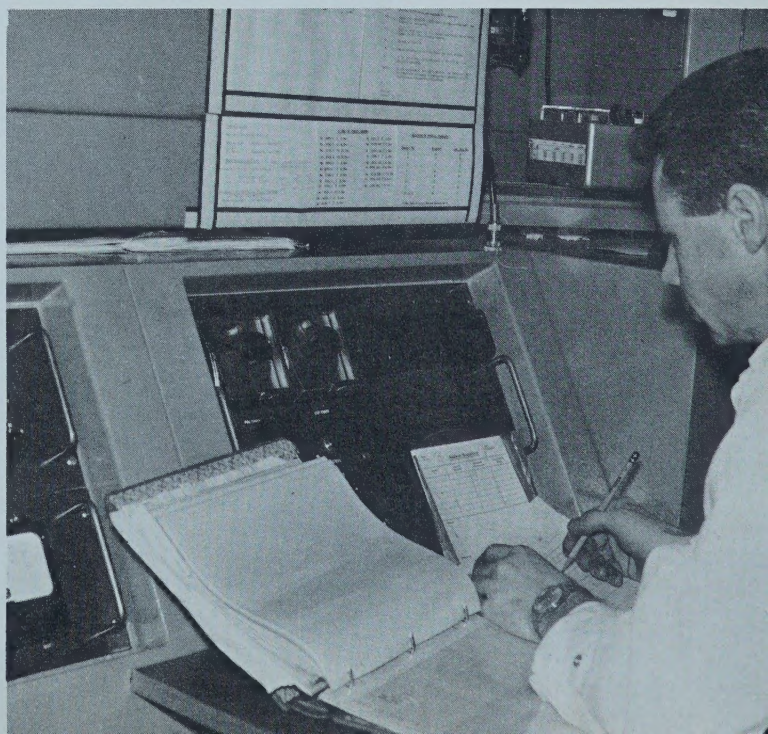
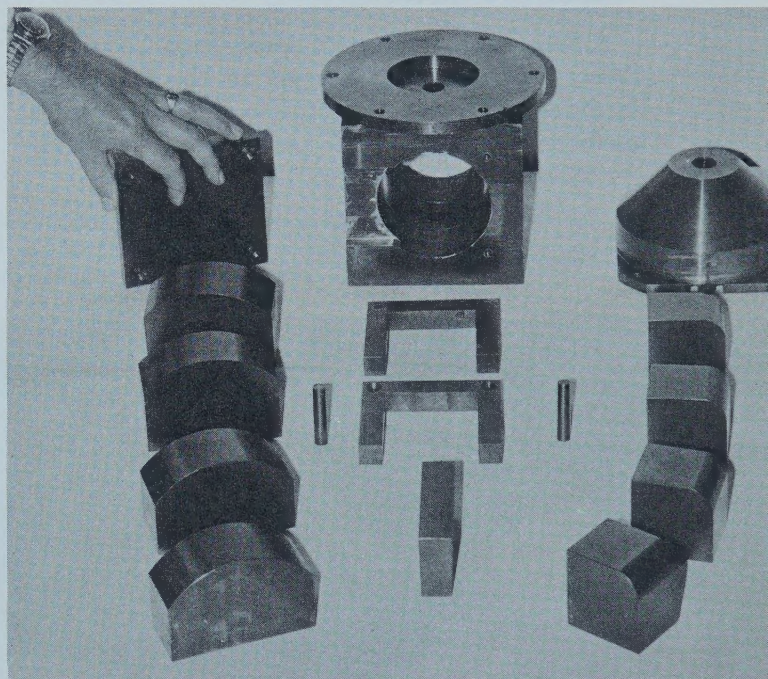
Increased interest is being shown in uranium alloys for both nuclear and non-nuclear use, and the special projects division devoted much of its effort in 1965 towards the development and production of alloys. An improvement in casting techniques is expected to result from the installation of a cobalt-60 radiation facility for X-Ray work.

In conjunction with the Research and Development Division, work continued at the Refinery towards establishment of a process for the production of hafnium-free zirconium alloys. A study is being undertaken of melting and subsequent extrusion characteristics of the metal.

Sales and Promotion

Two foreign orders for ceramic oxide, obtained by successful bids over a wide field of competitors, were indicative that close customer liaison over the past several years is now being rewarded. Emphasis

Enriched ceramic oxide is shipped overseas by air in "bird-cage" containers of special design (TOP). Eldorado specializes in making uranium alloy castings, such as those shown (Centre) for source shielding in medical equipment. Quality control involves use of such sophisticated devices as the direct reading emission spectrophotograph (Lower).



on casting and alloy development has resulted in increased business.

As part of its market development activity, Eldorado was represented at major nuclear conferences in Quebec City, in Washington, D.C., and in Sweden. A sales trip to Europe was made by Company representatives and meetings were held with the major reactor and utility companies in Switzerland, Germany, The Netherlands, and Sweden.

Research and Development

The major development effort of the Research and Development Division in 1965 was directed towards processes for recovery of non-uranium metals and compounds at the Refinery.

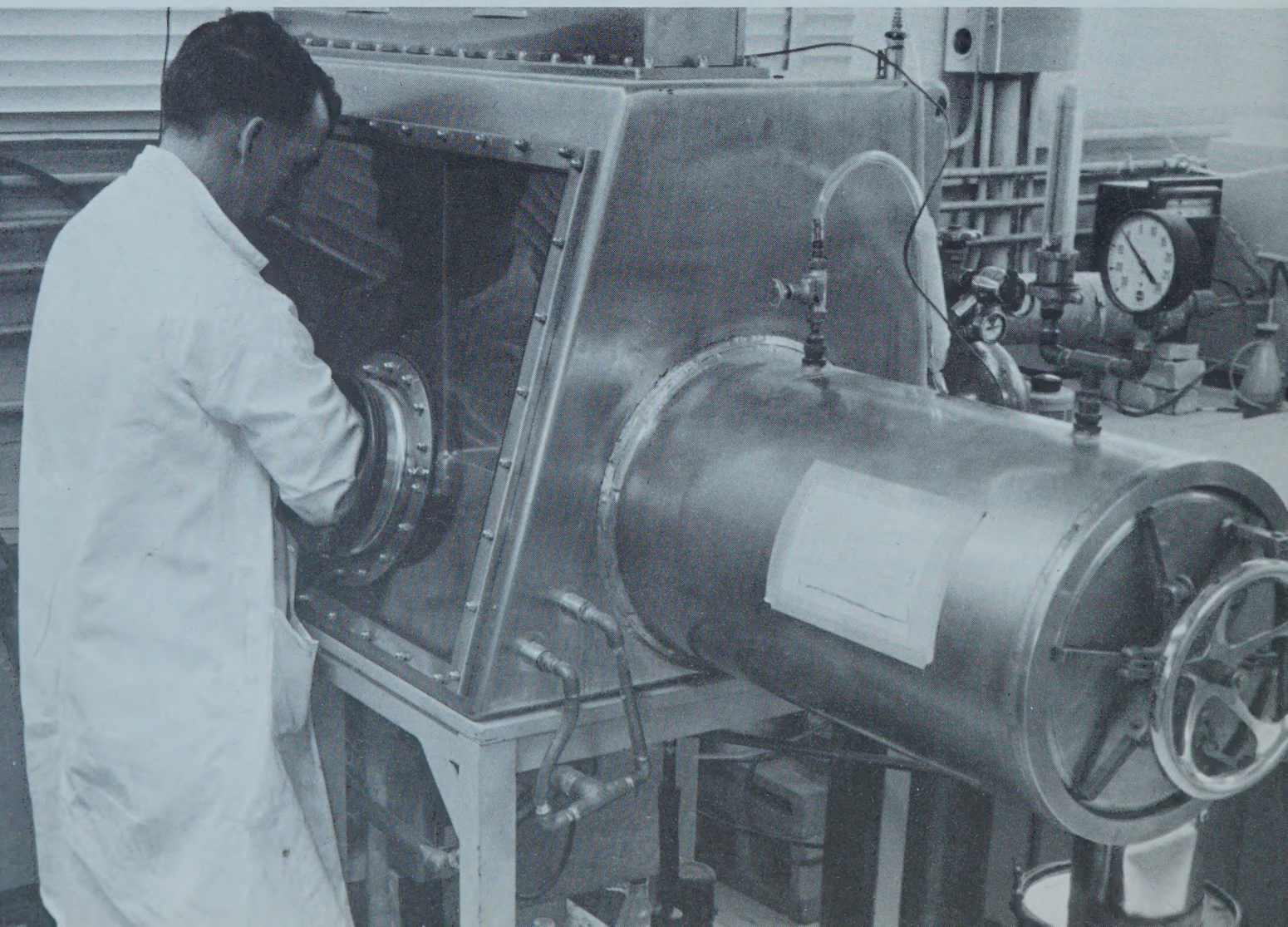
A substantial tonnage of speiss from Cobalt Refinery Limited was processed in the Port Hope facilities and many new process steps and control methods were developed. Leaching recoveries im-

proved to satisfactory levels, and there were excellent results in the separation of cobalt and nickel by solvent extraction techniques. Treatment of speiss or other concentrates containing cobalt, was developed to a point at which the design of a larger treatment plant could be undertaken, if it were required.

The zirconium development project reached the stage at which 60-70 pound ingots were produced on a routine basis, and the aim in 1966 is to produce 200-pound ingots and to have these processed to demonstrate the acceptability of the alloy obtainable by this new method. The ultimate objective is the establishment of a Canadian source of zirconium alloy for nuclear reactors. The Division has had invaluable assistance in the project from Atomic Energy of Canada Limited and the Mines Branch Laboratories.

GENERAL REPORT Continued on Page 16

Eldorado's Research and Development Laboratories in Ottawa are equipped with scientific apparatus of the latest design, such as the Cahn RG electrobalance, and the "dry box" shown below which is used for the preparation of unstable compounds in inert atmosphere.



ELDORADO MINING AND REFINING LIMITED

Statement of Income and Expense

for the year ended December 31, 1965

(with comparative figures for the year ended December 31, 1964)

	1965	1964
INCOME:		
Sales — Company's products and services	\$ 16,387,879	\$ 15,690,356
EXPENSE:		
Mining, milling and refining	13,518,114	5,175,437
Scientific research	1,654,702	1,179,651
Depreciation	664,656	4,103,015
Grants in lieu of municipal taxes	360,239	360,598
Selling and shipping expenses	239,443	153,701
Amortization of cost of acquiring rights to deliver concentrates on cancellation of contract with another producer	—	3,121,382
Amortization of pre-production, mine development and other deferred expenditures	69,510	410,772
	16,506,664	14,504,556
NET (LOSS) INCOME FROM OPERATIONS	(118,785)	1,185,800
OTHER INCOME:		
Income arising from the financing of ore procurement program	906,630	2,974,085
Interest and other non-operating income (net)	638,402	690,605
	1,545,032	3,664,690
INCOME BEFORE ADJUSTMENT FOR INCOME TAX	1,426,247	4,850,490
Provision for income tax (Note 1)	—	2,400,000
NET INCOME:	\$ 1,426,247	\$ 2,450,490

The accompanying notes are an integral part of the financial statements.

Eldorado Mining and Refining Limited

(Incorporated under the laws of the Province of Ontario)

BALANCE SHEET

at December 31, 1965

(with comparative figures for 1964)

ASSETS	1965	1964
CURRENT ASSETS:		
Cash	\$ 202,272	\$ 465,265
Deposit with Receiver General	4,000,000	13,200,000
Treasury bills and short-term bank deposits	3,497,847	1,696,561
Accounts receivable	4,284,565	8,169,147
Income tax recoverable (Note 1)	354,173	—
Advances in respect of stockpile program (Note 2)	7,312,705	—
Advances in respect of concentrates to be received	8,872,532	7,935,886
Concentrates and refinery products valued at lower of cost or realizable value	11,827,719	14,622,640
Operating and general supplies, at cost	2,595,910	2,434,999
Prepaid expenses	121,308	182,619
	<u>43,069,031</u>	<u>48,707,117</u>
Advances in respect of concentrates to be received in later years	29,362,500	36,847,711
Deferred account receivable in respect of concentrates delivered (Note 3) ..	25,612,899	25,422,502
	<u>54,975,399</u>	<u>62,270,213</u>
INVESTMENTS AND LOANS:		
Investments in wholly-owned subsidiary companies, at cost (Note 6) ..	187,153	187,153
Employees' housing loans	258,319	290,950
Municipal Corporation of Uranium City and District 5% debentures, maturing 1975-1979	780,403	827,305
	<u>1,225,875</u>	<u>1,305,408</u>
Excess of costs and expenses over sales of concentrates procured from other producers, recoverable before completion of contracts (Note 4)	—	241,811
CAPITAL ASSETS:		
Property, plant and equipment, at cost	50,177,564	51,699,102
Less: Accumulated depreciation	49,514,314	51,016,397
	<u>663,250</u>	<u>682,705</u>
	<u>\$ 99,933,555</u>	<u>\$ 113,207,254</u>

The accompanying notes are an integral part of the financial statements.
Approved on behalf of the Board

W. G. THOMPSON, *Director*.

FRED R. HADLEY, *Director*.

Refining Limited

(Canada Corporations Act)

Balance Sheet

31, 1965

(at December 31, 1964)

	LIABILITIES	1965	1964
CURRENT LIABILITIES:			
Accounts payable	\$	2,458,748	\$ 2,813,919
Advance payments in respect of concentrates and other products to be delivered		14,356,916	19,557,260
Provision for income tax		—	1,144,357
		<u>16,815,664</u>	<u>23,515,536</u>
Advance payments in respect of concentrates to be delivered in later years ..		29,362,500	37,690,274
Excess of sales over costs and expenses of concentrates procured from other producers, to be discharged before completion of contracts (Note 4) ...		<u>1,168,886</u>	<u>—</u>
CAPITAL:			
Capital Stock:			
Authorized — 110,000 shares of no par value			
Issued — 70,500 shares, fully paid		6,586,080	6,586,080
Surplus		46,000,425	45,415,364
		<u>52,586,505</u>	<u>52,001,444</u>
		<u>\$ 99,933,555</u>	<u>\$ 113,207,254</u>

I have examined the above Balance Sheet and the related Statement of Income and Expense and have reported thereon under date of February 17, 1966 to the Minister of Mines and Technical Surveys.

A. M. HENDERSON
Auditor General of Canada

Eldorado Mining and Refining Limited

Notes to Financial Statements

1. Depreciation and Income Tax

Depreciation has been recorded in the accounts at rates designed to amortize the cost of capital assets over the life of existing contracts and, in recent years, it has exceeded the maximum capital cost allowance permitted under the Income Tax Act in determining taxable income for tax purposes. In 1965, the permissible capital cost allowance exceeded the depreciation charged, which together with allowances for depletion and scientific research, has resulted in a loss for the year for income tax purposes. By virtue of this loss, a portion of the income tax paid in 1964 amounting to \$354,173 is recoverable. In addition, an amount of \$304,641, which had been provided in prior years for payment of income tax, is not now required. Both these amounts have been credited to Surplus.

2. Government of Canada Stockpile Program

The Treasury Board, with approval of the Governor in Council, has granted authority for the entry into contracts between Her Majesty the Queen in right of Canada, acting and represented by Eldorado Mining and Refining Limited, and certain Canadian uranium producers for the purchase by Her Majesty of uranium bearing concentrates for a Government of Canada stockpile. At December 31, 1965, the Company was the custodian of uranium bearing concentrates thus acquired at a cost of \$33,012,475. The cost of these concentrates, being chargeable to parliamentary appropriations, is therefore not included in the accounts of the Company.

As no parliamentary authority existed in 1965 whereby funds were available for further purchases of uranium bearing concentrates under this Program, the Company was empowered by the Treasury Board on August 18, 1965 to employ its surplus funds to make such purchases. The Company had advanced \$7,312,705 for this purpose up to December 31, 1965 and this amount was repaid to the Company on February 15, 1966.

3. Deferred Account Receivable

The contract with the United Kingdom Atomic Energy Authority for the sale of 12,000 tons of uranium in concentrates provides for certain deliveries on which payments do not become due until later years of the contract period. The account thus deferred amounting to \$25,612,899 is expected to reach the maximum of \$25,719,000 in 1966 and will be recovered during the years 1971 - 1973 in equal annual instalments.

4. Excess of Sales over Costs and Expenses of Concentrates procured from other Producers

During the year there was an excess of sales over costs and expenses of concentrates procured from other producers of \$1,410,697. At December 31, 1964 costs and expenses exceeded sales by \$241,811, leaving a balance at December 31, 1965 of \$1,168,886 to be offset in the period 1968 - 1971 when deliveries will be made at prices lower than the costs of acquisition.

5. Remuneration of Directors

Total remuneration of directors as directors, officers or employees of the Company for the year was \$36,000.

6. Subsidiary Companies

The assets, liabilities, income and expenses of the Company's two wholly-owned subsidiaries, Eldorado Aviation Limited and Northern Transportation Company Limited, have not been included in the financial statement of Eldorado Mining and Refining Limited.

The net expenses of Eldorado Aviation Limited are recovered from Eldorado Mining and Refining Limited and Northern Transportation Company Limited. The aggregate profits of Northern Transportation Company Limited as at December 31, 1965 amounted to \$5,640,596.

All three companies are Crown corporations as defined by section 76(c) of the Financial Administration Act and as such each is required to report annually to the appropriate Minister in compliance with the provisions of that Act.

ELDORADO MINING AND REFINING LIMITED

Statement of Sales and Costs
of Uranium Concentrates Procured
from other Producers

for the year ended December 31, 1965

(with comparative figures for the year ended December 31, 1964)

	1965	1964
Sales under contracts with:		
United States Atomic Energy Commission	\$ 11,010,786	\$ 23,045,239
United Kingdom Atomic Energy Authority	28,806,857	38,982,293
	<hr/> 39,817,643	<hr/> 62,027,532
Costs of concentrates sold	37,469,319	56,267,284
	<hr/>	<hr/>
Excess of Sales over Costs	2,348,324	5,760,248
	<hr/>	<hr/>
Administrative expenses	30,997	38,367
Financial charges	906,630	2,974,085
	<hr/> 937,627	<hr/> 3,012,452
	<hr/>	<hr/>
Excess of sales over costs and expenses of concentrates procured from other pro- ducers (Note 4)	\$ 1,410,697	\$ 2,747,796

The accompanying notes are an integral part of the financial statements.

ELDORADO MINING AND REFINING LIMITED

Statement of Surplus

for the year ended December 31, 1965

(with comparative figures for the year ended December 31, 1964)

	1965	1964
Balance at beginning of year	\$ 45,415,364	\$ 44,464,874
Net profit for year	1,426,247	2,450,490
Income tax recoverable (Note 1)	354,173	—
Reversal of prior years' overprovisions for income tax (Note 1)	304,641	—
	<hr/> 47,500,425	<hr/> 46,915,364
Dividend	1,500,000	1,500,000
	<hr/>	<hr/>
Balance at end of year	\$ 46,000,425	\$ 45,415,364

The accompanying notes are an integral part of the financial statements.

AUDITOR GENERAL
OF CANADA

Ottawa, February 17, 1966.

The Honourable JEAN-LUC PEPIN,
Minister of Mines and Technical
Surveys, Ottawa.

SIR,

I have examined the accounts and financial statements of Eldorado Mining and Refining Limited for the year ended December 31, 1965. In compliance with the requirements of section 87 of the Financial Administration Act, I report that, in my opinion:

- (a) proper books of account have been kept by the Company;
- (b) the financial statements of the Company
 - (i) were prepared on a basis consistent with that of the preceding year and are in agreement with the books of account,
 - (ii) in the case of the balance sheet, give a true and fair view of the state of the Company's affairs as at the end of the financial year, and
 - (iii) in the case of the statement of income and expense, give a true and fair view of the income and expense of the Company for the financial year; and
- (c) the transactions of the Company that have come under my notice have been within the powers of the Company under the Financial Administration Act and any other Act applicable to the Company.

Yours faithfully,

A. M. HENDERSON.
Auditor General of Canada.

ELDORADO AVIATION LIMITED

(Incorporated under the Canada Corporations Act)

Balance Sheet

at December 31, 1965

(with comparative figures at December 31, 1964)

ASSETS			LIABILITIES		
	1965	1964		1965	1964
CURRENT ASSETS:			CURRENT LIABILITIES:		
Cash	\$ 49,890	\$ 42,141	Accounts payable	20,680	34,443
Accounts receivable:					
Eldorado Mining and Refining Limited ...	5,190	15,809			
Northern Transportation Co. Ltd.	6,430	1,734			
Other	4,554	7,262			
	<u>16,174</u>	<u>24,805</u>			
Operating supplies, at cost	57,462	59,273			
Prepaid insurance	19,624	9,146			
Total Current Assets	<u>143,150</u>	<u>135,365</u>			
CAPITAL ASSETS, at cost:			CAPITAL:		
Aircraft, including major spare parts	985,811	994,478	Capital Stock:		
Shop, hangar and loading equipment, etc.	35,899	35,127	Authorized — 50,000 shares of \$1 each		
Office furniture and equipment	8,398	7,873	Issued — 28,006 shares, fully paid	28,006	28,006
	<u>1,030,108</u>	<u>1,037,478</u>	Surplus	227,683	227,683
Less: Accumulated depreciation	896,889	882,711		<u>255,689</u>	<u>255,689</u>
	<u>133,219</u>	<u>154,767</u>			
	<u>\$ 276,369</u>	<u>\$ 290,132</u>		<u>\$ 276,369</u>	<u>\$ 290,132</u>

Approved on behalf of the Board

W. M. GILCHRIST,
Director.

W. J. BENNETT,
Director.

I have examined the above Balance Sheet and the related Statement of Recoverable Expenses and have reported thereon under date of February 25, 1966 to the Minister of Mines and Technical Surveys.

A. M. HENDERSON,
Auditor General of Canada.

ELDORADO AVIATION LIMITED

Statement of Recoverable Expenses

for the year ended December 31, 1965

(with comparative figures for the year ended December 31, 1964)

	1965	1964
Salaries and wages (including remuneration of directors, \$21,000)	\$ 215,745	\$ 210,522
Repairs	107,715	173,021
Supplies	134,029	150,014
Depreciation	50,987	62,144
Hangar expense	49,664	52,788
Insurance	23,188	36,113
Contributions to employees' pension plan	21,863	20,896
Landing fees and radio maintenance	12,922	11,996
Travel	3,378	2,202
Miscellaneous	13,326	20,083
	<hr/>	<hr/>
	632,817	739,779
Less: Miscellaneous income	54,382	22,430
	<hr/>	<hr/>
Net Expenses	578,435	717,349
	<hr/>	<hr/>

Note: The above net expenses were recovered from:

Eldorado Mining and Refining Limited ...	\$ 444,849	\$ 543,755
Northern Transportation Company Limited	133,586	173,594
	<hr/>	<hr/>
	578,435	717,349
	<hr/>	<hr/>

AUDITOR GENERAL OF CANADA

Ottawa, February 25, 1966.

The Honourable JEAN-LUC PEPIN,
Minister of Mines and Technical
Surveys, Ottawa.

SIR,

I have examined the accounts and financial statements of Eldorado Aviation Limited for the year ended December 31, 1965. In compliance with the requirements of section 87 of the Financial Administration Act, I report that, in my opinion:

(a) proper books of account have been kept by the Company;

(b) the financial statements of the Company

(i) were prepared on a basis consistent with that of the preceding year and are in agreement with the books of account,

(ii) in the case of the balance sheet, give a true and fair view of the state of the Company's affairs as at the end of the financial year, and

(iii) in the case of the statement of recoverable expenses, give a true and fair view of the expenses of the Company for the financial year; and

(c) the transactions of the Company that have come under my notice have been within the powers of the Company under the Financial Administration Act and any other Act applicable to the Company.

Yours faithfully,

A. M. HENDERSON
Auditor General of Canada.

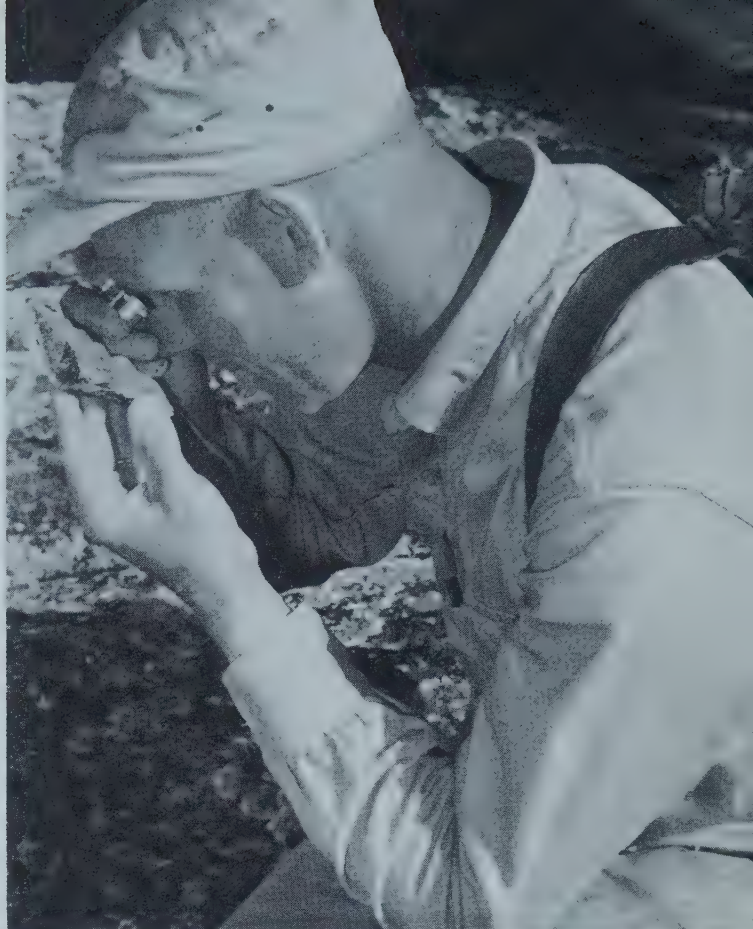
Uranium Procurement

Sales of Canadian uranium for export through Eldorado in 1965 followed the downward trend of the past several years. The volume at 7,059,466 pounds U_3O_8 was 37 per cent below the 1964 total of 11,259,229 pounds, and 77 per cent below the all-time peak of 30,996,065 in 1959. The 1965 value at \$55,128,622 dropped 28 per cent below the 1964 figure of \$76,298,692, and 83 per cent below the 1959 peak of \$325,328,282.

The four mines which had remained in production at the end of 1964 were still operating at the end of 1965: Rio Algom Nordic, Denison, Stanrock, and Eldorado's Beaverlodge. As of December 31 about 3.6 per cent of the uranium called for under the original contracts remained to be delivered to the United Kingdom Atomic Energy Authority and the United States Atomic Energy Commission, as well as 38.9 per cent of the 12,000-ton United Kingdom contract.

Eldorado commenced at mid-year to receive concentrates delivered under the Government's second stockpiling arrangement. Two mines, Denison and Rio Algom, made scheduled deliveries. In 1966, Stanrock is expected to enter the program, and early in 1967, deliveries from Eldorado's Beaverlodge mine will commence.

With the dramatic construction and programming of nuclear reactors in the Western world, there has been a renewal of exploration for new deposits in Canada not only by the active uranium producers, but by other mining concerns both domestic and foreign. The granting of mining concessions by the various provincial governments, together with increased staking of claim blocks, geological mapping, geophysical surveys and surface diamond drilling, are indicative of the degree of interest in exploration.



Prospecting for uranium brings into play scientific knowledge and skill. Field geologists become expert in detecting telltale signs of radioactive minerals.

Snow, ice and temperatures in the 40-below-zero range offered no real deterrent to diamond drilling operations at Beaverlodge during the Winter of 1965-66. The photographs of the drilling camp were taken in February.



Organization and Personnel

The work force of the Company at December 31, 1965, totalling 783, was virtually the same as at the beginning of the year, although by the standards of previous years there had been a moderately heavy turnover of personnel at Beaverlodge Mine and the Port Hope Refinery.

At times during the year there were serious shortages of technical personnel, professionals and tradesmen at the Beaverlodge Operation. A search for personnel in these categories in Canada proved unavailing, but a number of suitable men were recruited overseas to ease the situation. The Company is engaged in vigorous efforts to attract graduates from various Canadian universities and continues to follow its policy of providing Summer employment for undergraduates as a means of stimulating their interest in mining and to give mining students the opportunity for practical experience. There were 71 students on the rolls of the Company last Summer.

The following is the composition and distribution of the work force at the year-end:

	Hourly- rated Employees	Salaried Employees	Totals 1965	Totals 1964
Beaverlodge Operation	392	139	531	542
Port Hope Refinery	105	56	161	149
Research & Development	3	53	56	63
Edmonton Office	—	8	8	8
Head Office	—	27	27	28
Totals	500	283	783	790

Wages and salaries paid in 1965 totalled \$5,856,543, compared with \$5,590,053 in 1964. Company contributions to the Pension, Employee

Group Insurance and Welfare plans amounted to \$359,003 in 1965, against \$335,993 in 1964.

New collective bargaining agreements were entered into during the year at Beaverlodge Operation, with the International Union of Mine, Mill and Smelter Workers (Canada); at the Port Hope Refinery, with the United Mine Workers of America; and at the Metallurgical Laboratories at Ottawa, with the Civil Service Association of Canada.

Eldorado Aviation Limited

The cost of operation of the Company's transport aircraft dropped in 1965 to \$525,761, from \$668,271 in 1964, although ton-miles flown increased slightly from 2,346,108 in 1964 to 2,368,675 last year. The transports handled freight and passenger tonnage of 4,569, an increase of 133 tons over 1964. The DC-4 was used almost entirely in hauling freight and passengers for Beaverlodge Operation, while the DC-3 operated from late April to mid-October on the run from Edmonton to Tuktoyaktuk on the Arctic Coast, serving the needs of Northern Transportation Company Limited, Eldorado's other subsidiary. One of the Company's helicopters was in service on Northern's operations out of Tuktoyaktuk, while another operated at Beaverlodge.

The staff numbered 34 at year-end, and total 1965 wages and salaries amounted to \$263,602. Company contributions to employee pension and welfare plans amounted to \$23,363.

From the commencement of its activities in May, 1944, originally as a division of the parent Company, to the end of 1965, the transport aircraft of Eldorado Aviation Limited had flown 13,654,000 miles, in excess of 70,000 flying hours, and had carried more than 79,000 tons of freight and 111,000 passengers.

Meeting the challenge of handling outsize and odd-shaped items is all in the day's work for Eldorado Aviation Limited employees. The load on the big pallet weighed 4,500 pounds and seemed much too large for the relatively tiny door of the DC-4, but was stowed away for the flight from Edmonton to the Beaverlodge Mine.



The History of Eldorado

Uranium, a mineral that was regarded a quarter-century ago as being relatively valueless, has brought more than \$1,700,000,000 into the Canadian economy since 1954. In 1958 and 1959 the value of uranium produced in Canada exceeded that of any other metal mined in this country. The operations of Eldorado Mining and Refining Limited have generated about one dollar of every five that Canada has derived from the sale of uranium.

Prior to World War II it is probable that not more than one of every 50,000 people in the world had even heard of uranium. Even in scientific circles it was still looked upon as an element of minor interest and with limited possibilities. There was so little demand for it that there was virtually no market, even at prices of \$1.50 to \$2.00 per pound that were well below the cost of production. The advent of the nuclear age has changed all that, and there is growing awareness that within the next decade or so uranium will be in short supply.

The threat of a critical shortage seems paradoxical in face of the fact that the element uranium is known to occur under such a variety of geological conditions that it could probably be found in small quantities in almost any part of the world. Igneous rocks constitute 90 per cent of the Earth's crust, and all such rocks contain at least traces of uranium and its cousin element, thorium. Minute quantities are found in all the world's rivers and seas. Geologically, uranium is less abundant than copper, nickel or zinc, but more abundant than gold or silver.

This abundance is, of course, a relative thing. The fact that uranium exists in trace amounts in rock and sand and sea does not mean that vast quantities can be extracted for man's use. A deposit containing one-tenth of one per cent uranium oxide represents a concentration about 300 times the average abundance in the Earth's crust. By far the greater part of Canada's ore reserves — which are equal to more than one-third the total known reserves of the Western world — average only 0.1 per cent uranium oxide.

Generally speaking, the geology of Canada is favorable to the discovery of large and relatively rich deposits of uranium, if enough time, money and technical knowledge are applied to the search. Unlike gold, for example, which is discovered in the form of veins, threads, layers, nuggets and granules, uranium is never found in nature in the metallic state, but always occurs in combination with oxygen as oxides or silicates. The refined metal is white on fresh fracture, but takes on a bronze-like tarnish upon exposure to air. It is not quite as hard as steel, but has a density about two and one-half times that of steel. Its most outstanding physical characteristic is its radioactivity.

The Discovery of Radium

A German chemist, Klaproth, experimented with some unusual black ore that came from a mine at Joachimsthal in Bohemia, and discovered the element uranium in

1789. It remained a mere laboratory curiosity for more than a century. In 1896 Henri Becquerel learned by sheer chance that pitchblende emitted radiation not unlike the x-rays discovered by Röntgen. His published observations set the Curies on the path to an important scientific achievement.

The Curies discovered radium and its transformation product, polonium. They demonstrated that radium exists in all naturally-occurring uranium in the ratio of about one part in 3,000,000, and accounts for its radioactivity.

After it became known that radium would have important applications in the treatment of diseases, particularly tumors and cancers, as well as a number of uses in industry, demand created a fantastic value for the few grains — not grams — that could be derived annually from the only known source, the primitive mine in Bohemia. A quarter-gram was worth \$50,000. When mines were developed in the United States, about 1912, radium became more readily available and the price came down to about \$125,000 a gram, or \$3,500,000 per ounce. Early in the 1920's a Belgian syndicate developed a mine in the Congo, and with substantial quantities of ore and new and better methods of refining it was able to stifle U.S. competition and enjoy a virtual monopoly at a price of about \$70,000 a gram. This continued until the mid-1930's when Canada became a major producer of radium.

The Mine that Broke the Monopoly

In the late 1920's Gilbert Labine of Eldorado Gold Mines Limited undertook aerial prospecting in the Far North, and was rewarded with the finding not only of silver and cobalt along the eastern shore of Great Bear Lake, but of substantial quantities of pitchblende. Claims were staked and development of the mine was begun as quickly as equipment could be brought in, virtually all of it by air-lift in the small aircraft available at the time. Initial operations were directed mainly towards the silver, cobalt and gold values in the ore, but it soon became apparent the real wealth of the mine lay in the pitchblende.

A small refinery was established at Port Hope, Ontario, almost 3,000 miles from the mine itself. Shipping of concentrates by air, water and rail began in 1932. The refinery made its first delivery of Canadian-produced radium in 1933. In November, 1936, it completed production of its first ounce (28 grams) of radium, and by 1938 a monthly output of 2.5 grams was reported. The actual product of the refinery was radium bromide of 90 per cent purity, which was sent to England for accurate determination of radio-active content, final refinement, and preparation into usable form.

Even though the amounts involved seem relatively minute, the rising Canadian production broke the Belgian monopoly and the price of radium dropped rapidly. In 1940 demand had diminished, substantial inventories

Canada's Uranium Sales 1955 - 1965

to the United States Atomic Energy Commission and
the United Kingdom Atomic Energy Authority

POUNDS U₃O₈ SOLD

DOLLAR VALUE OF SALES

	<i>Industry Total</i>	<i>Eldorado</i>	<i>Other Producers</i>	<i>Total</i>
1955	2,030,767	\$ 23,687,582	\$ 1,190,547	\$ 24,878,129
1956	4,223,704	21,511,508	20,785,781	42,297,289
1957	12,152,916	26,554,646	98,985,240	125,539,886
1958	26,796,084	33,010,520	246,904,045	279,914,565
1959	30,996,065	29,998,052	295,330,230	325,328,282
1960	24,960,435	31,720,083	234,037,824	265,757,907
1961	19,270,884	24,786,036	177,544,698	202,330,734
1962	17,080,037	21,718,388	151,964,007	173,682,395
1963	15,216,812	21,292,683	118,607,491	139,900,174
1964	11,259,229	14,271,161	62,027,531	76,298,692
1965	7,059,466	15,310,978	39,817,644	55,128,622
	<u>171,046,399</u>	<u>\$263,861,637</u>	<u>\$1,447,195,038</u>	<u>\$1,711,056,675</u>

were on hand, labor was scarce, so Eldorado closed the Port Radium mine.

Concurrent with the production of radium through the 1930's Eldorado had sold significant quantities of silver from the mine and had developed a small market for such uranium salts as yellow and orange sodium uranate and black oxide, mainly for use in the coloring of glass and ceramics. The price of these salts ranged from \$2.50 to \$2.92 per pound in 1938.

Eldorado Becomes a Crown Company

An urgent need for uranium in quantity arose with the inception in 1942 of the Manhattan Project, the joint British-United States-Canadian undertaking which eventually brought forth the atomic bomb. Canada's role was to supply the uranium raw material, and the Government requested the re-opening of the Port Radium mine on an emergent basis, but gave no hint as to the reason. The mine and mill, as well as the Port Hope refinery, were in full operation by early 1943. Shipments of uranium were made, but it is believed the actual material used for the first atomic bomb was not of Canadian origin.

The Company name was changed from Eldorado Gold Mines Limited to Eldorado Mining and Refining Limited in June, 1943. Late in that year, when it became evident that the atomic bomb would be feasible, the three gov-

ernments concerned decided that they should at once gain complete control of uranium resources within their respective territories. On January 28, 1944, Eldorado was expropriated and the operation was taken over by the Crown-owned Eldorado Mining and Refining (1944) Limited. Northern Transportation Company Limited, a wholly-owned subsidiary of Eldorado, was one of the assets acquired.

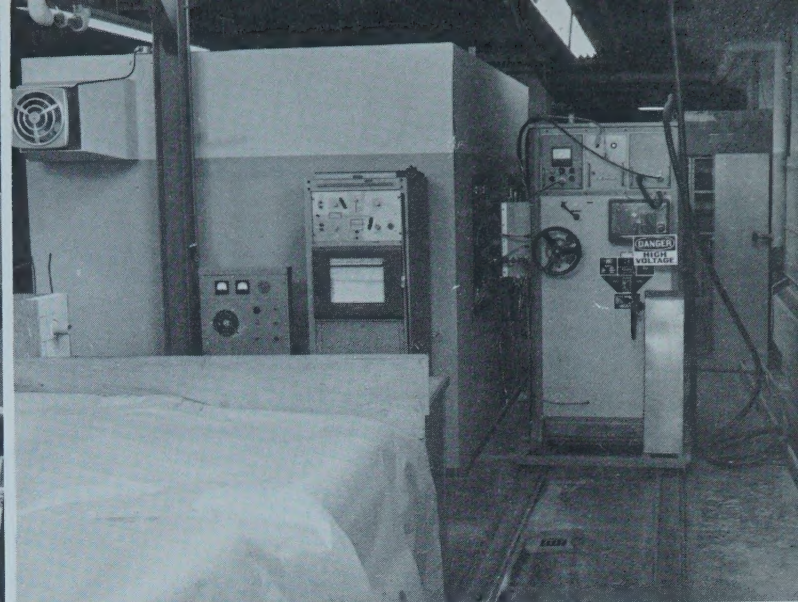
The Canadian Uranium Boom

While the ore of the Port Radium mine was exceedingly rich in uranium content, the deposit eventually gave out and the mine was placed on a caretaker basis in September, 1960. In the meantime, in the late 1940's, Eldorado prospectors had found important deposits in the Lake Athabasca region, leading to development of the Beaverlodge mine which went into production in 1953. Eldorado continued to be Canada's sole producer of uranium until cold war demands created new and urgent demands which led to the discovery and development of other major deposits, especially in the Blind River and Bancroft areas of Ontario and the Beaverlodge region of Northwestern Saskatchewan. By 1958 there were 25 producing mines in Canada, and the peak output of almost 31,000,000 pounds of uranium oxide was attained the following year.

The amount of uranium provided by Eldorado for military purposes during World War II and up to 1954



↑ Outstanding scientists, skilled technicians, a highly-specialized and up-to-date library, and laboratory equipment of the most exacting nature, provide the effective combination for Eldorado's Research and Development program.



Many of the processes and much of the equipment at Eldorado's Refinery at Port Hope, Ontario, are unique in Canadian industry. LEFT an operator is engaged in vacuum arc melting of zirconium metal. RIGHT is the large vacuum furnace. ↓



is still classified information. However, the Company's revenue from 1944 to the end of 1954, from the sale of uranium and from some sales and rentals of radium, was about \$82,000,000. Its income from uranium sales in the period 1955-65 inclusive was \$263,861,000, and in the same term its revenue from operation of the refinery amounted to \$35,661,000.

From its original investment of \$9,246,877 in acquiring ownership of Eldorado, the Canadian Government has derived a return of \$33,740,000 in dividends and redemption of shares. From 1944 to the end of 1965 the Company has paid federal taxes, provincial royalties, and grants in lieu of municipal taxes, amounting to a total of \$35,826,000. The net worth of the Company at the end of 1965 was \$52,600,000.



History of Eldorado Aviation

The remoteness of the Port Radium mine made air transportation essential from the beginning. In 1944 Eldorado bought its own aircraft to assist in field exploration work and the movement of personnel, perishable goods, and emergency supplies. The service was expanded and a regular schedule instituted with the inception of the Beaverlodge mine, and in 1953 the Aviation Division was incorporated as a wholly-owned subsidiary, Eldorado Aviation Limited. It provides air service at cost for Eldorado and Northern Transportation Company Limited.

Over the past eleven years aircraft of the Company have flown 13,650,000 miles and carried more than 79,000 tons of freight and 111,000 passengers.

